

High Performance Thermoplastic Hot Melt Adhesive for Polar Substrates

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Introduction

Lamination Adhesives in Automotive Interior Trim

Attach ***coverstock*** to ***rigid substrate***

- leather, synthetics, fabrics, etc.
- ABS, PP, PC, etc.

Liquid Adhesive Technologies

- Solvent-based
- Water-based

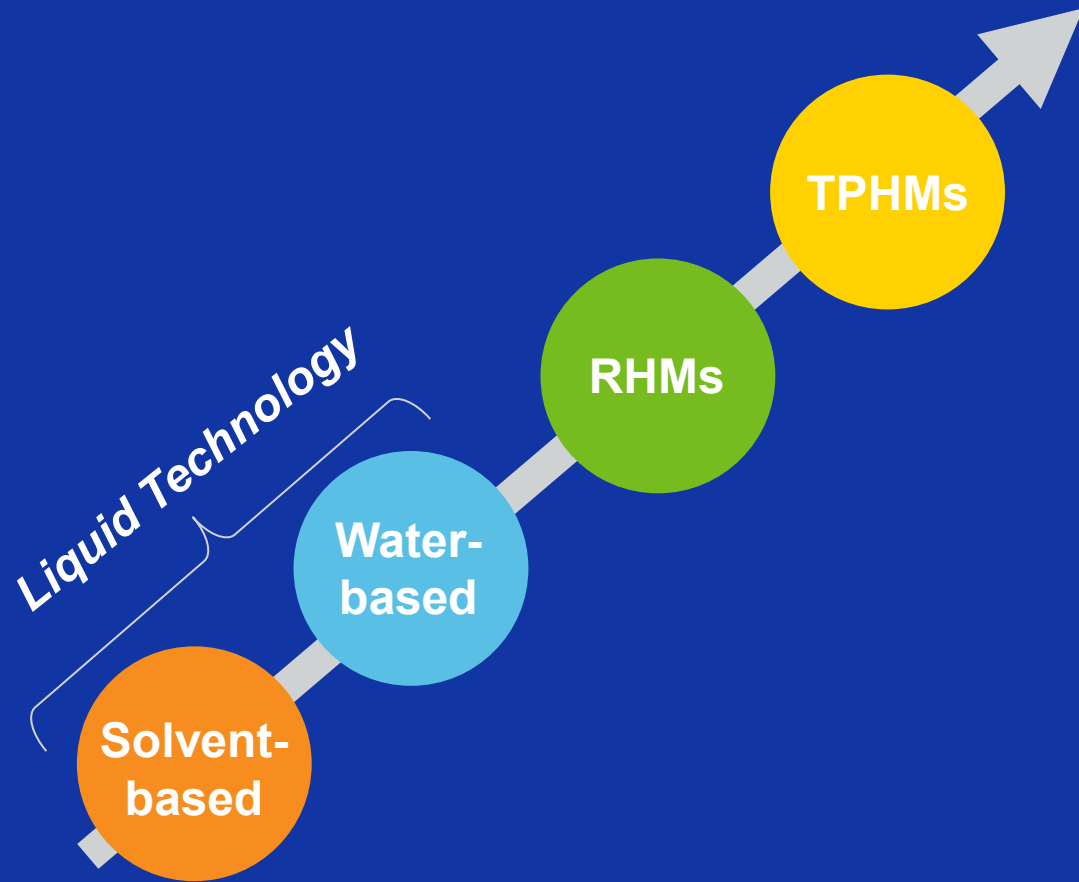
Solid Adhesive Technologies

- Reactive Hot Melt (RHM)
- Thermoplastic Hot Melt (TPHM)



Introduction

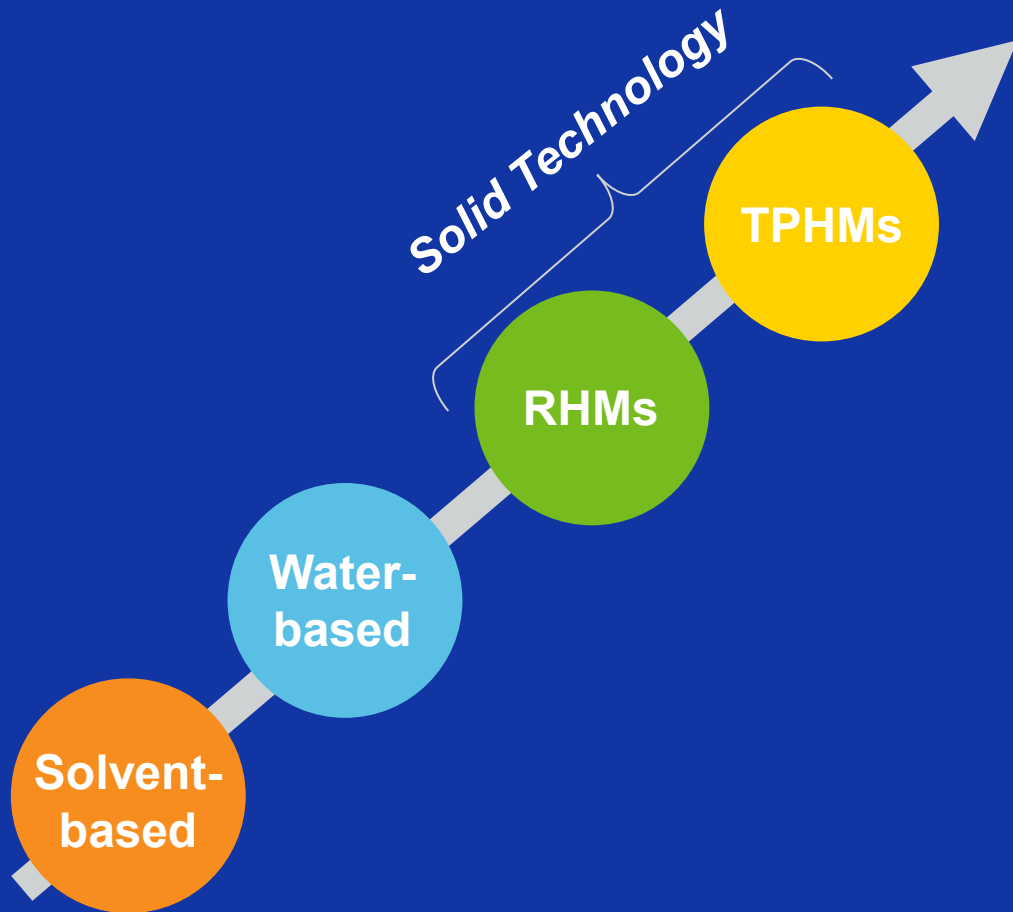
Evolution of Adhesive Technologies in Interior Trim



	Solvent-based	Water-based
Heat Resistance	High	High
Drying Speed	Faster	Slower
Environment, Health & Safety	---	✓

Introduction

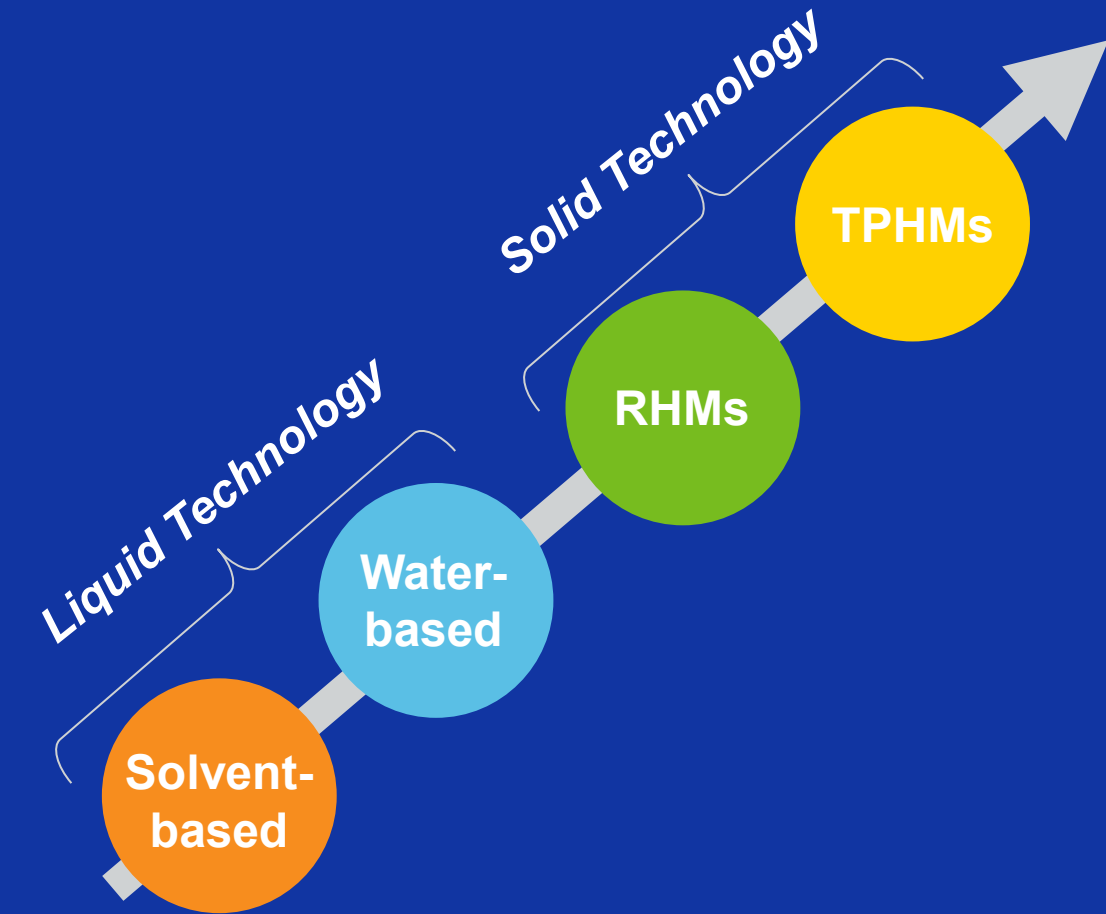
Evolution of Adhesive Technologies in Interior Trim



	RHMs	TPHMs
Heat Resistance	High	Limited
Setting Speed	Fast	Fast
Curing	Yes	No
Environment, Health & Safety	---	✓

Introduction

Evolution of Adhesive Technologies in Interior Trim

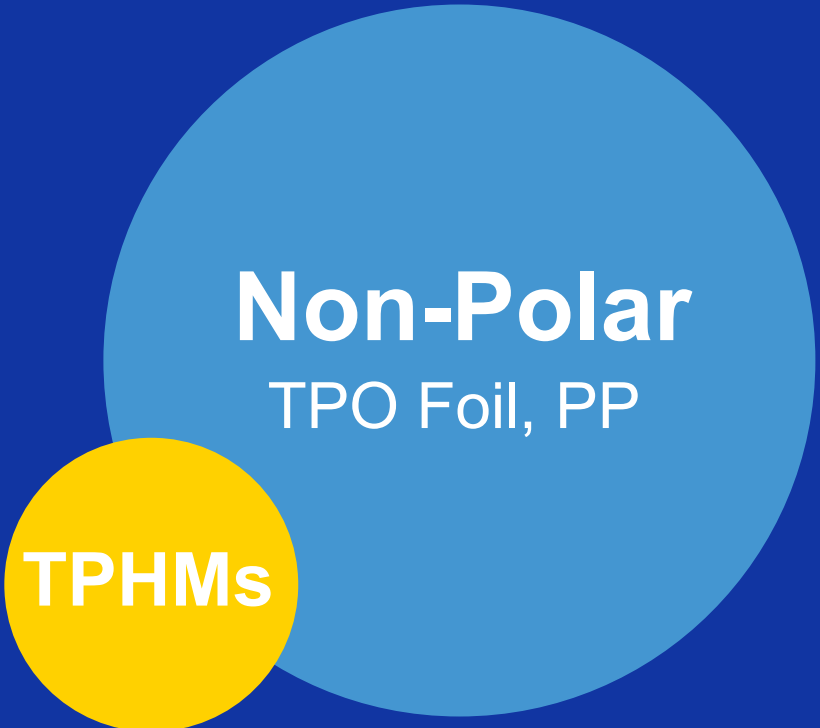


Main drivers for technical evolution:

1. Reducing **total** cost per part
2. Trends in materials



Bonding Today's Materials

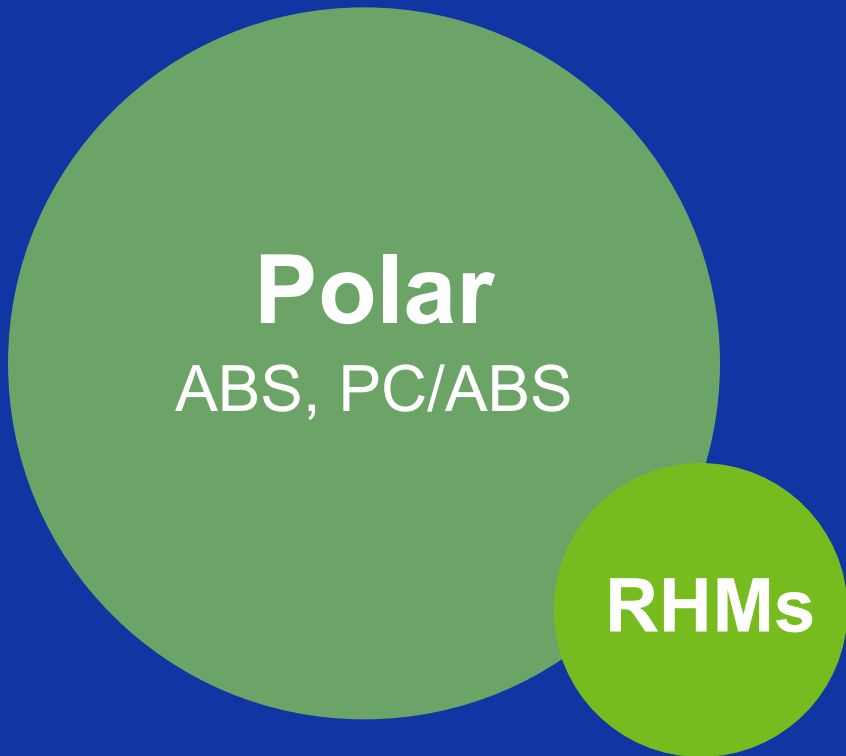


Non-Polar
TPO Foil, PP

The diagram shows a large light blue circle representing 'Non-Polar' materials. To its left is a smaller yellow circle representing 'TPHMs'.

TPHMs

✓ Thermoplastic Hot Melts



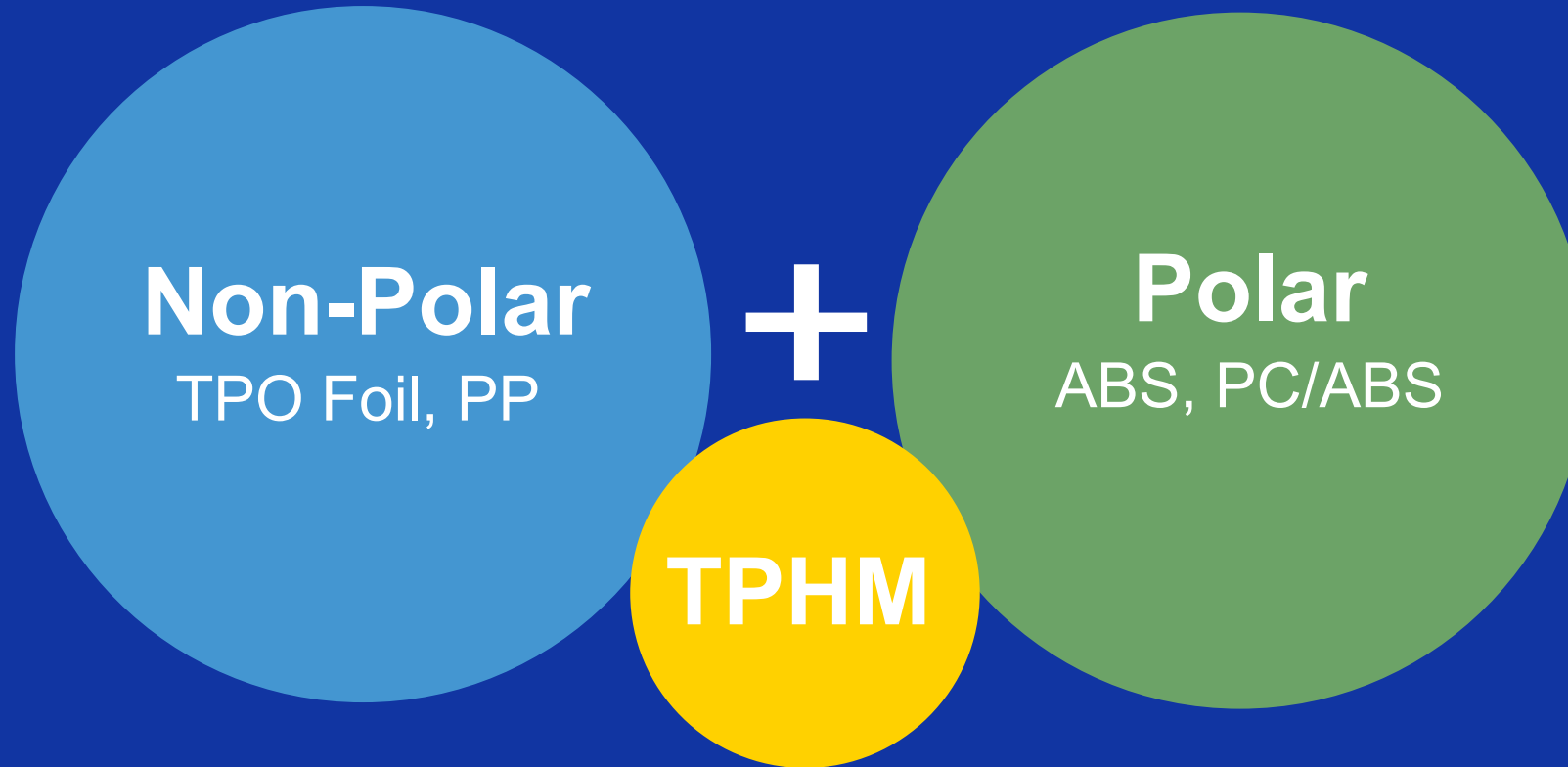
Polar
ABS, PC/ABS

The diagram shows a large green circle representing 'Polar' materials. To its right is a smaller lime green circle representing 'RHM's'.

RHM's

✓ Reactive Hot Melts

Solving What's Next



Thermoplastic Hot Melt for both

Outline

01 Introduction + Motivation

02 Material + Adhesive
Overview

03 Adhesive Performance
Results

04 Summary + Conclusions

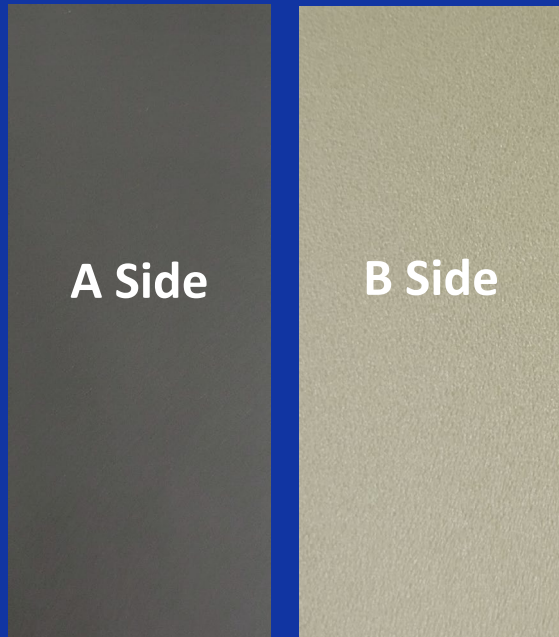


Materials

Non-Polar

TPO Foil

Thermoplastic Polyolefin



Smooth Surface, Primed

PP

Polypropylene



Unfilled

Polar

ABS

Acrylonitrile Butadiene Styrene



Automotive Grade, Filled (Glass)

PC/ABS

Polycarbonate ABS



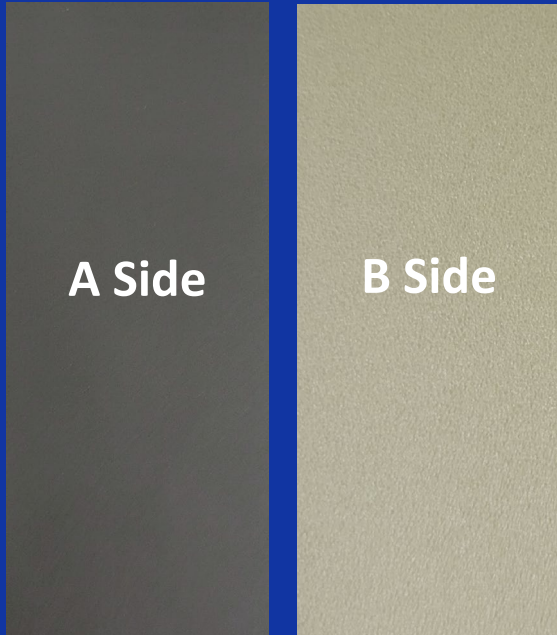
Filled (Black)

Coverstock

Non-Polar

TPO Foil

Thermoplastic Polyolefin



Smooth Surface, Primed

PP

Polypropylene



Unfilled

Polar

ABS

Acrylonitrile Butadiene Styrene



Automotive Grade, Filled (Glass)

PC/ABS

Polycarbonate ABS



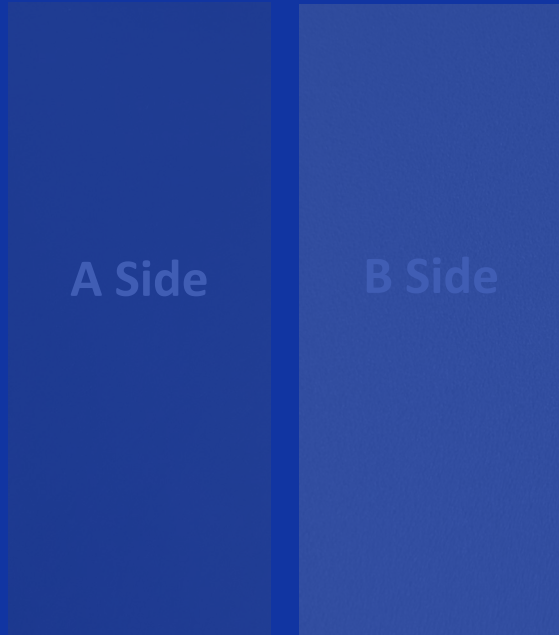
Filled (Black)

Rigid Substrates

Non-Polar

TPO Foil

Thermoplastic Polyolefin



Smooth Surface, Primed

PP

Polypropylene



Unfilled

Polar

ABS

Acrylonitrile Butadiene Styrene



Automotive Grade, Filled (Glass)

PC/ABS

Polycarbonate ABS



Filled (Black)



Adhesive Properties

	Benchmark Adhesive	XP27910-1
Color	Amber	Amber
Viscosity (Brookfield @ 180°C)	28,000 cPs	19,000 cPs
Softening Point (Mettler Toledo)	155°C	159°C
Open Time (Internal Method)	10-20 sec	10-20 sec
Substrates	✓ Thermoplastic polyolefin (TPO) foil ✓ Polypropylene (PP) – <i>untreated</i>	✓ Thermoplastic polyolefin (TPO) foil ✓ Polypropylene (PP) – <i>untreated</i> ✓ Acrylonitrile butadiene styrene (ABS) ✓ Polycarbonate ABS (PC/ABS)

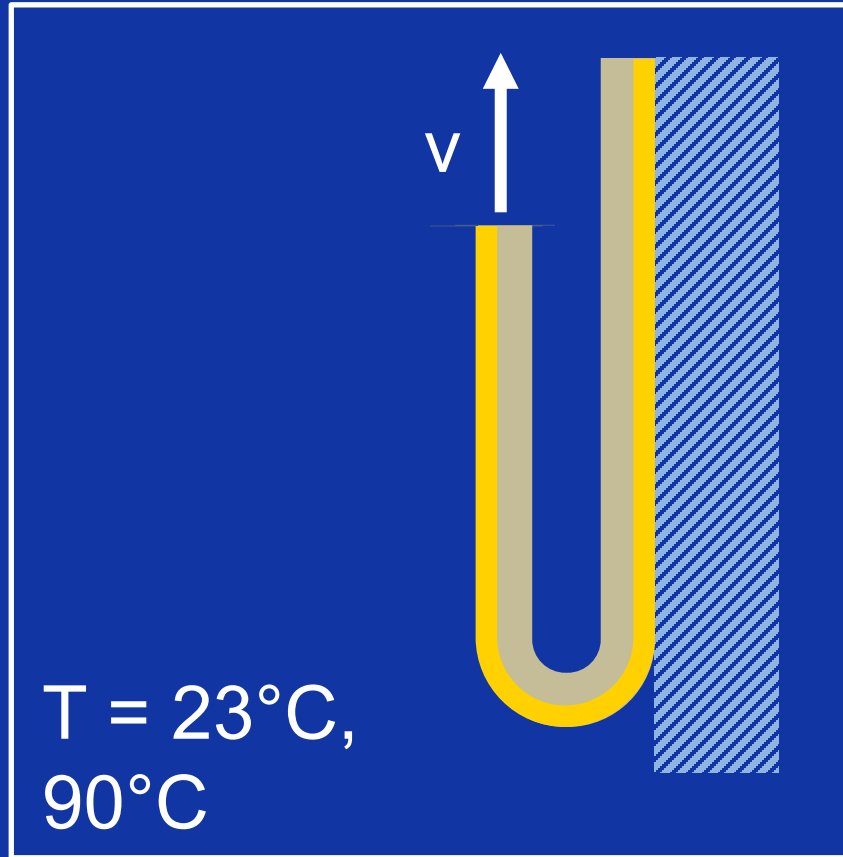
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- 02 Material + Adhesive Overview
- 03 Adhesive Performance Results
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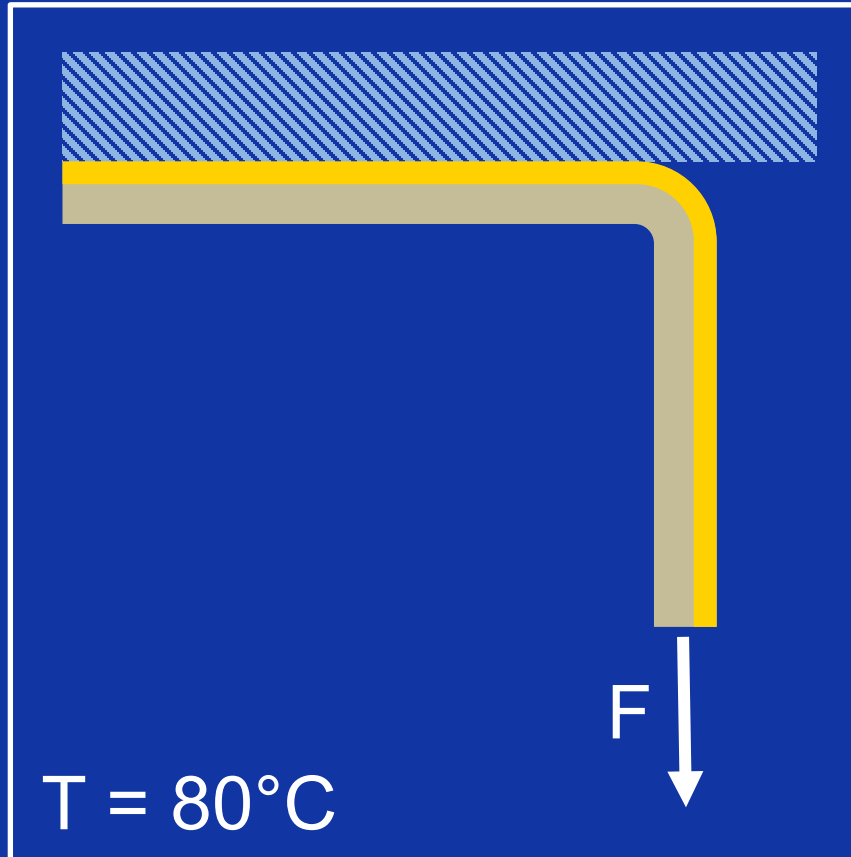


Tests for Adhesive Performance

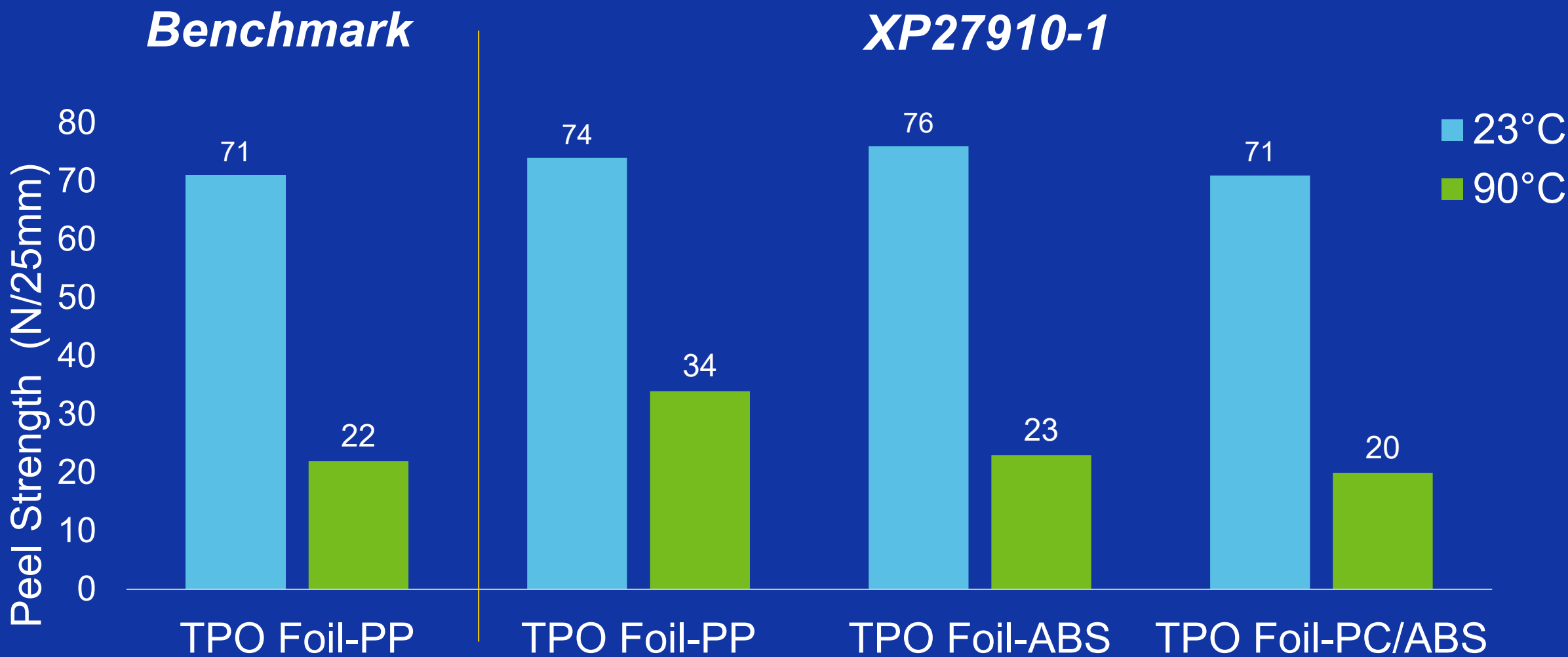
180° Peel Strength



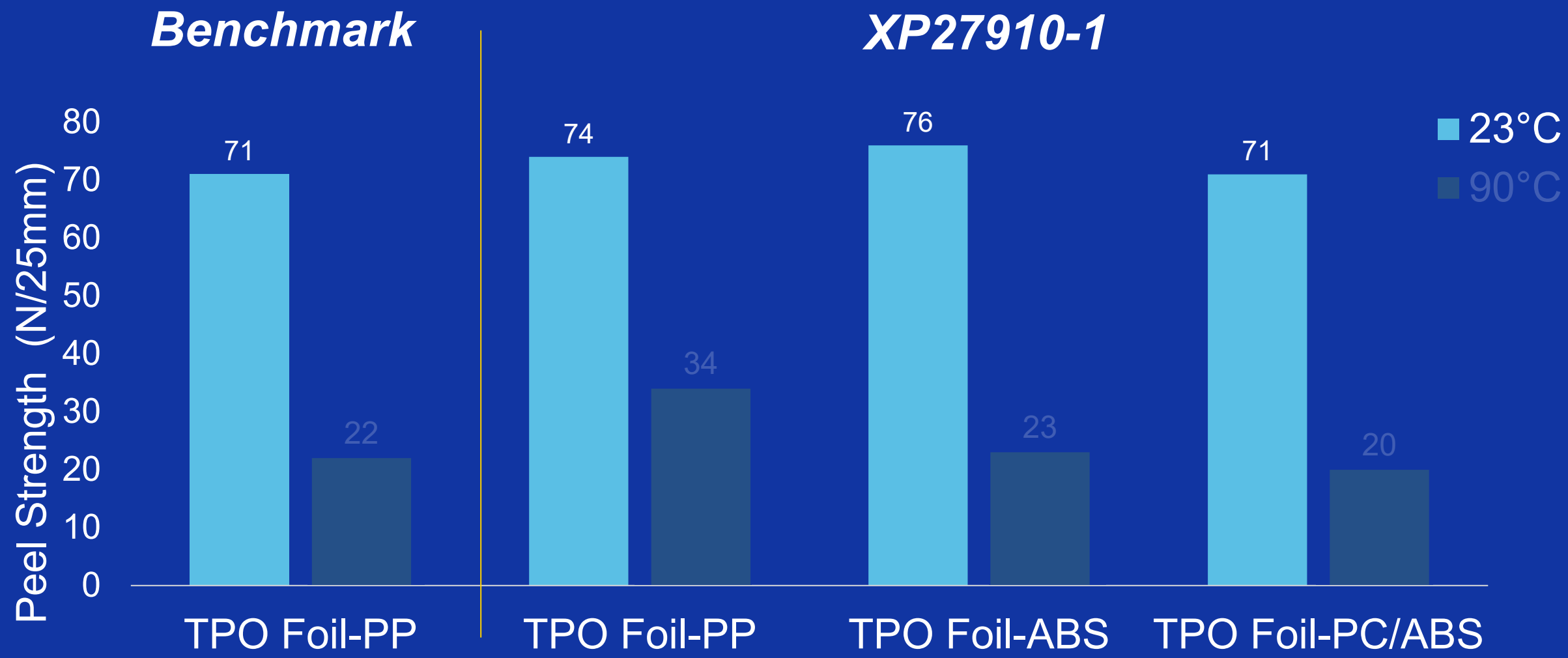
Creep Resistance



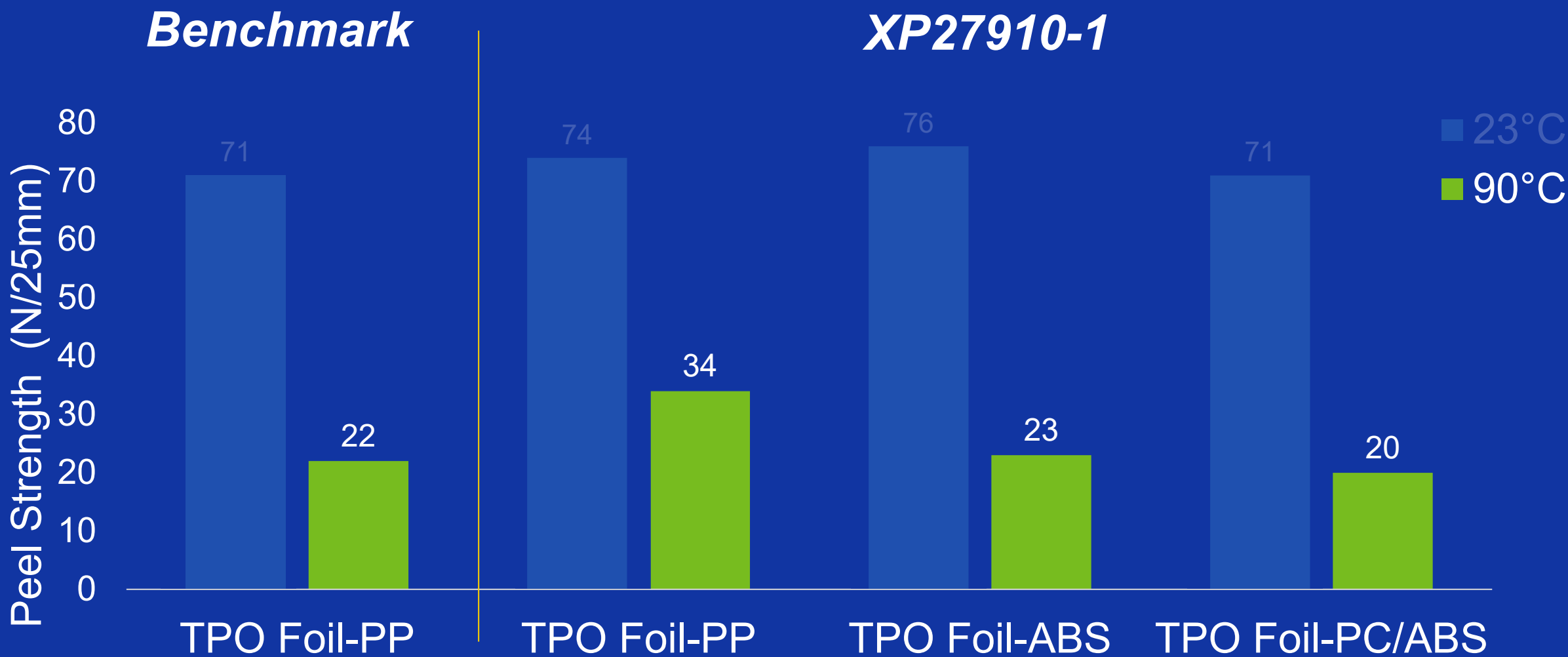
180° Peel Performance Testing



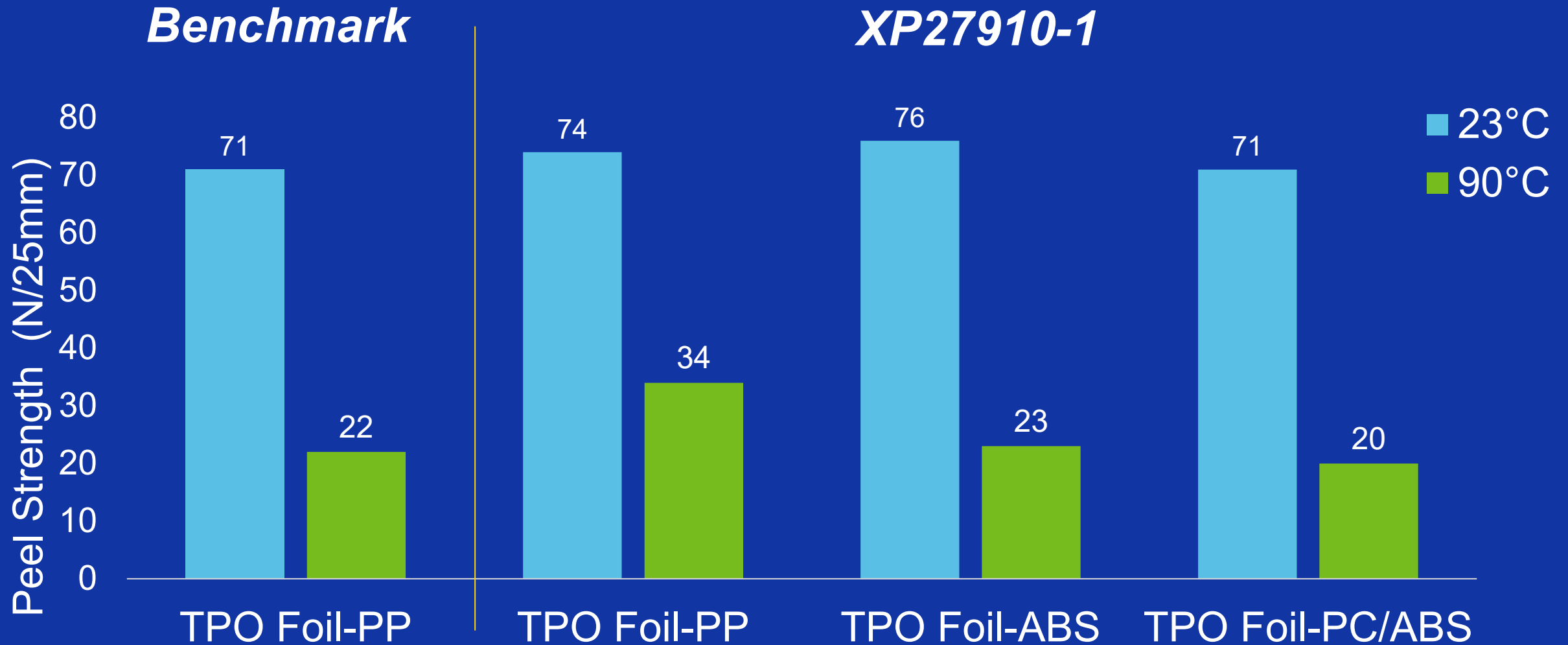
Ambient Performance



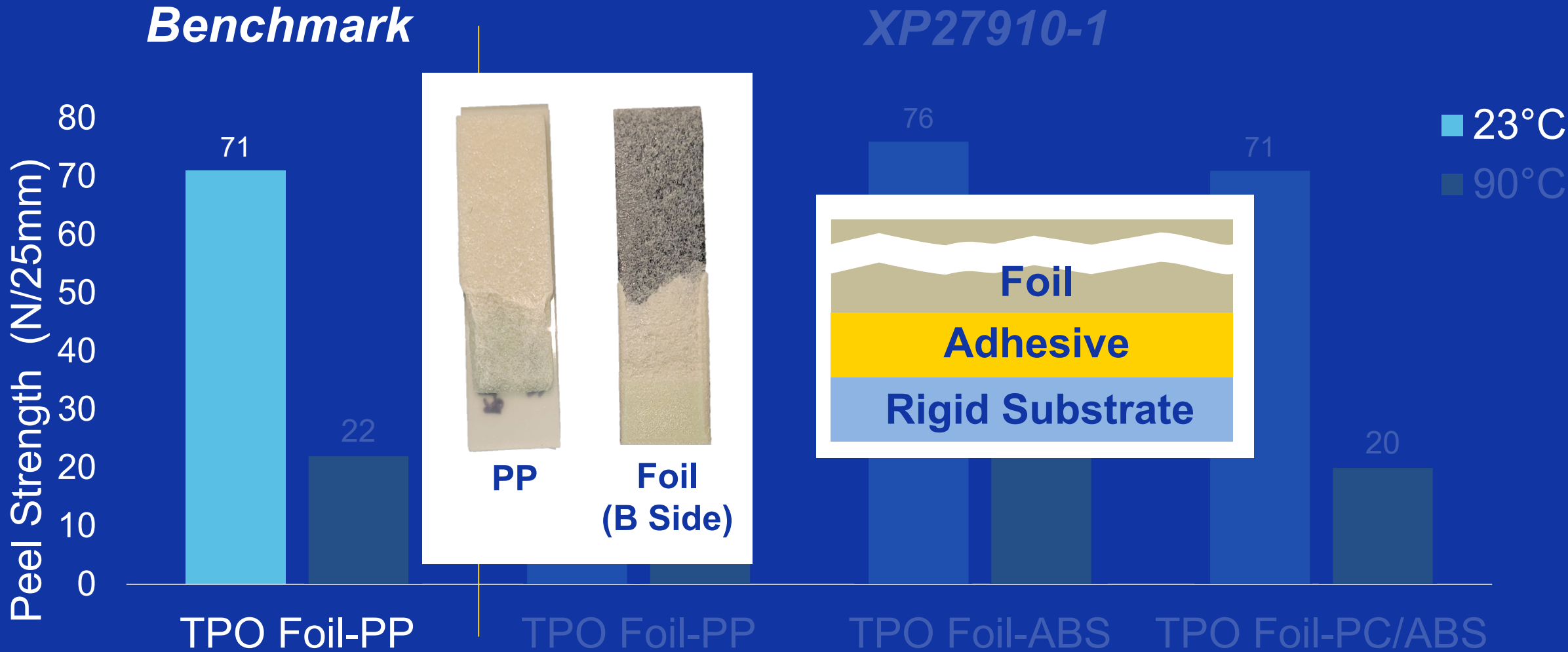
Performance at 90°C



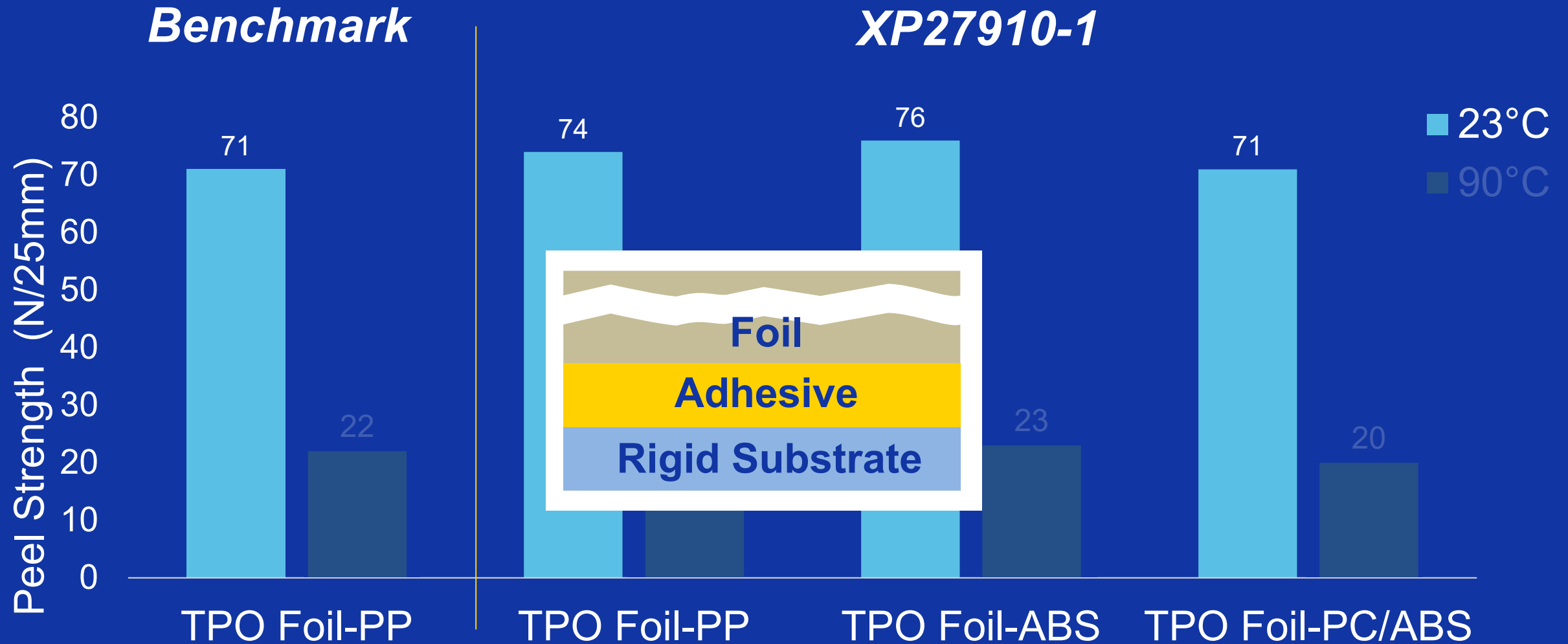
Performance Depends on Temperature



Foil Failure at Ambient Temperature

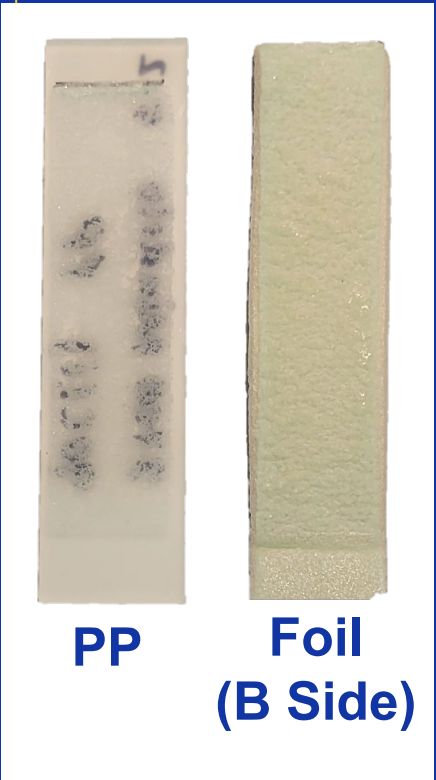
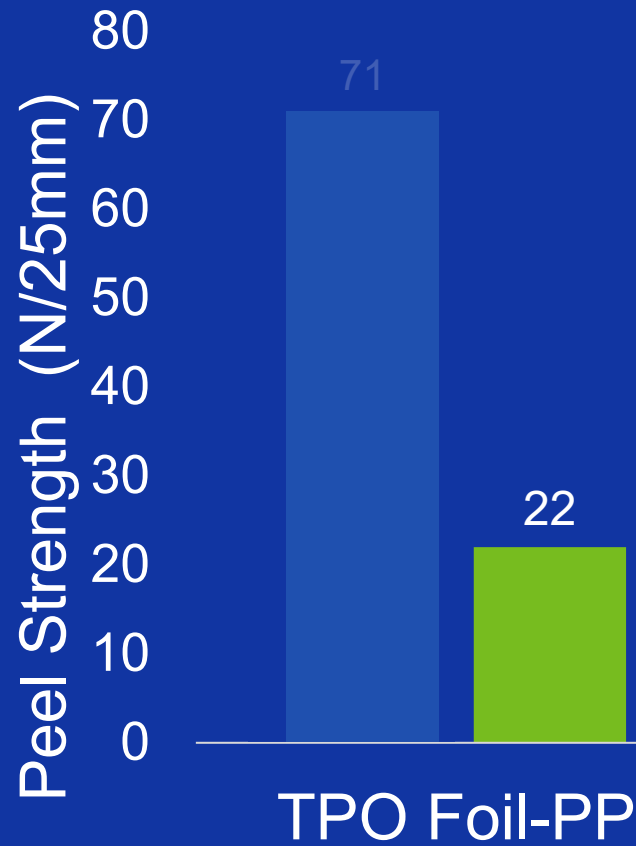


Foil Failure at Ambient Temperature

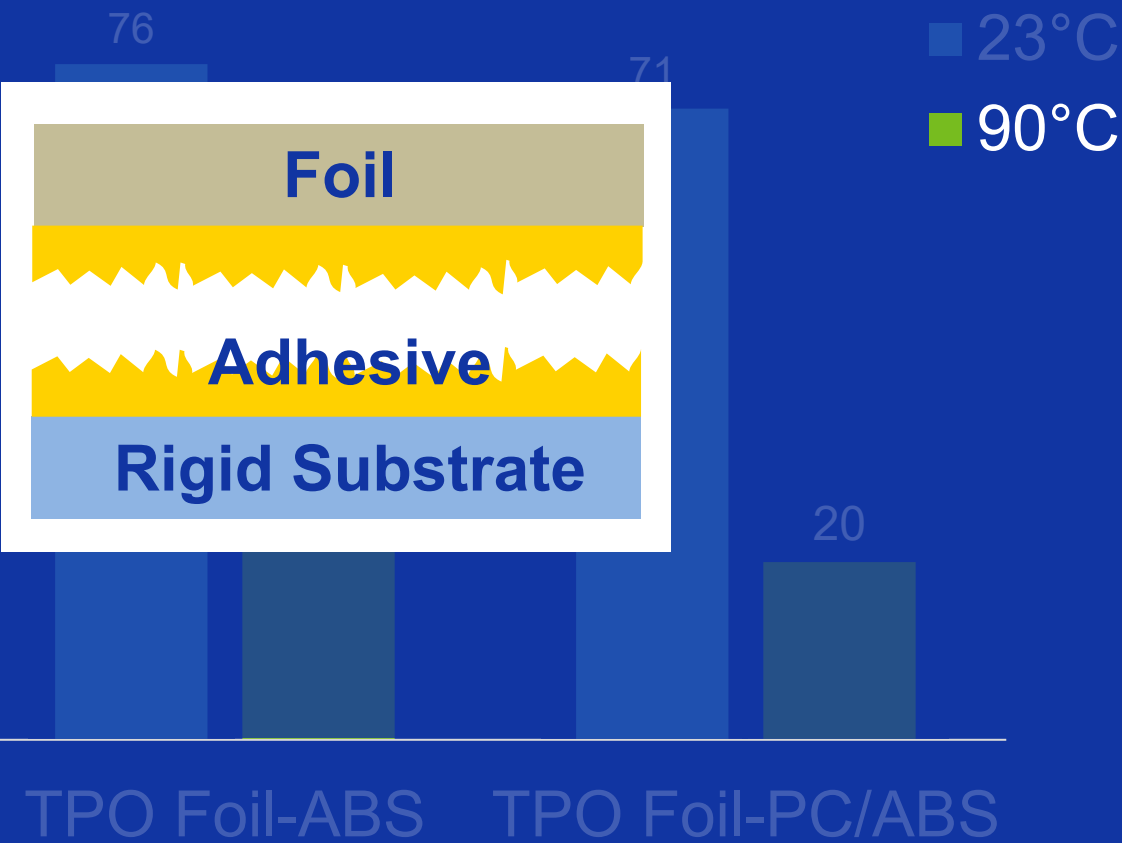


Cohesive Failure at High Temperature

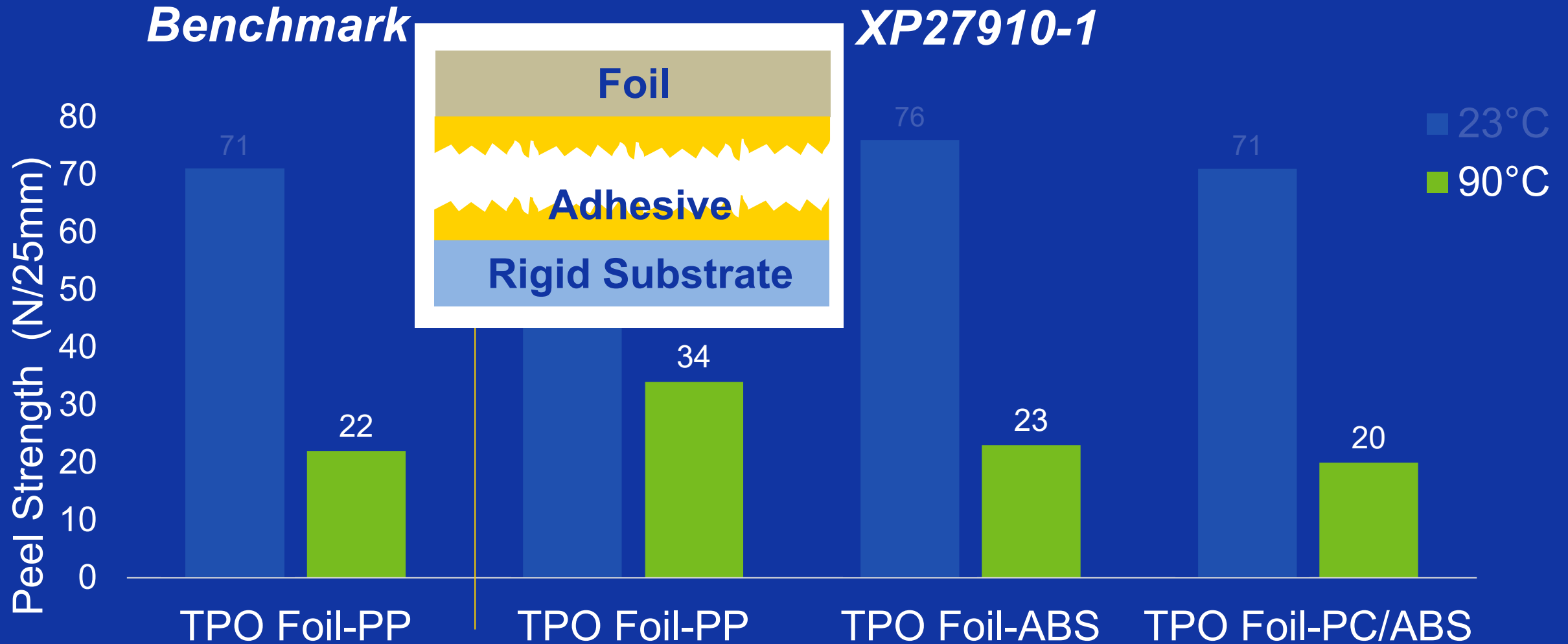
Benchmark



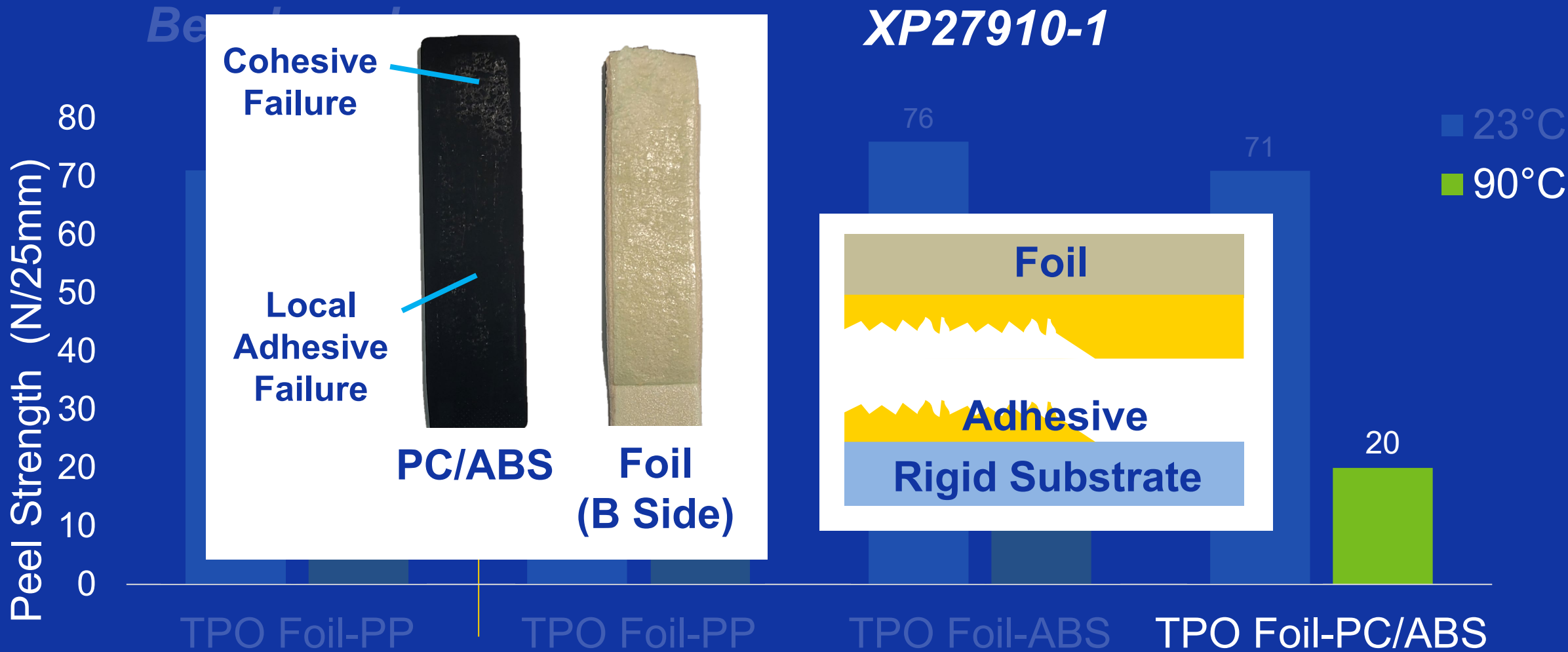
XP27910-1



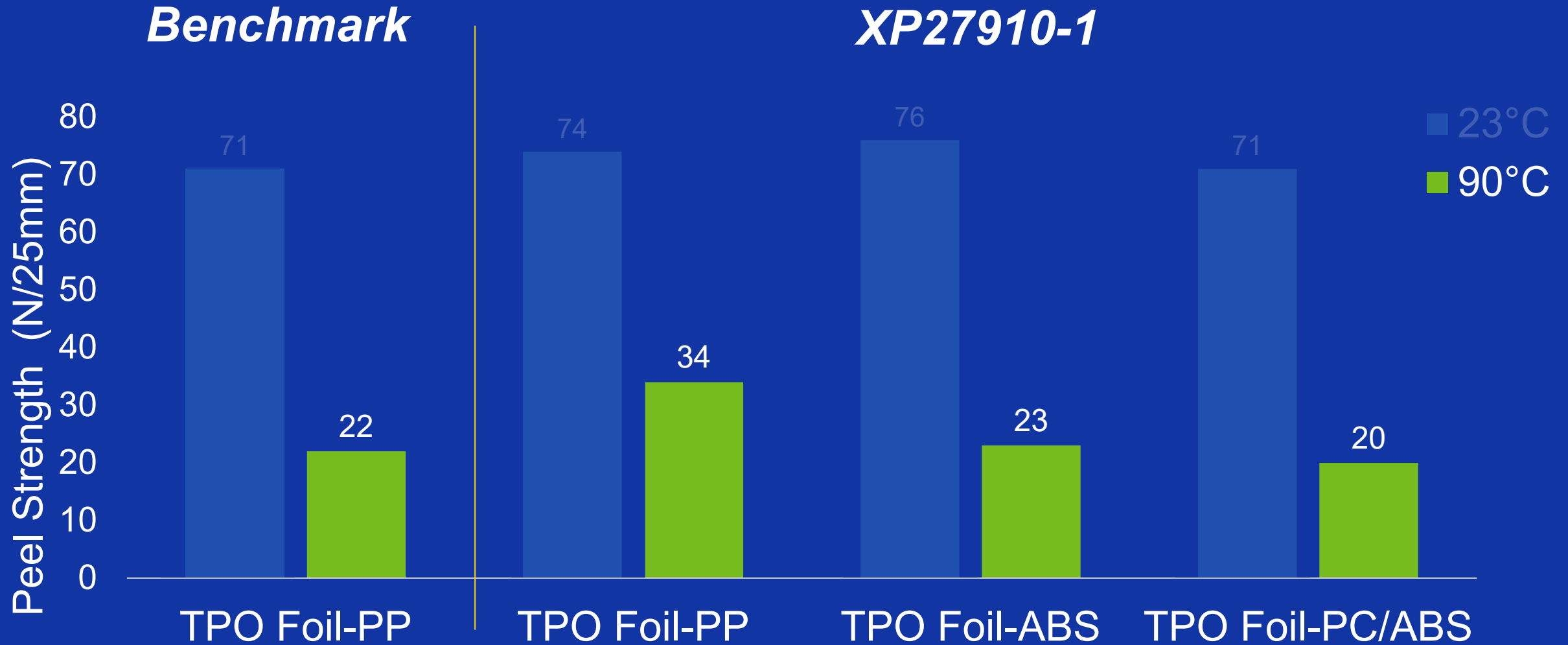
Cohesive Failure at High Temperature



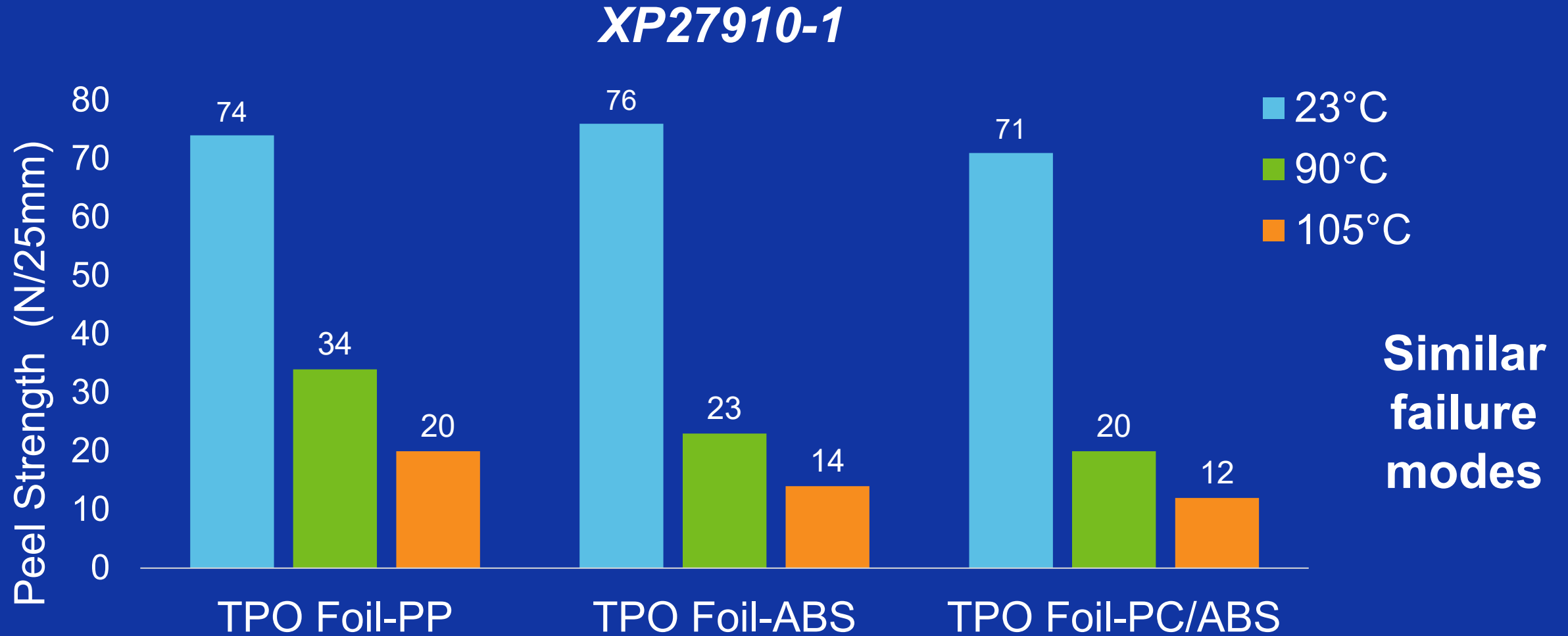
Local Failure Variation at High Temp.



High Temp. Performance Maintained



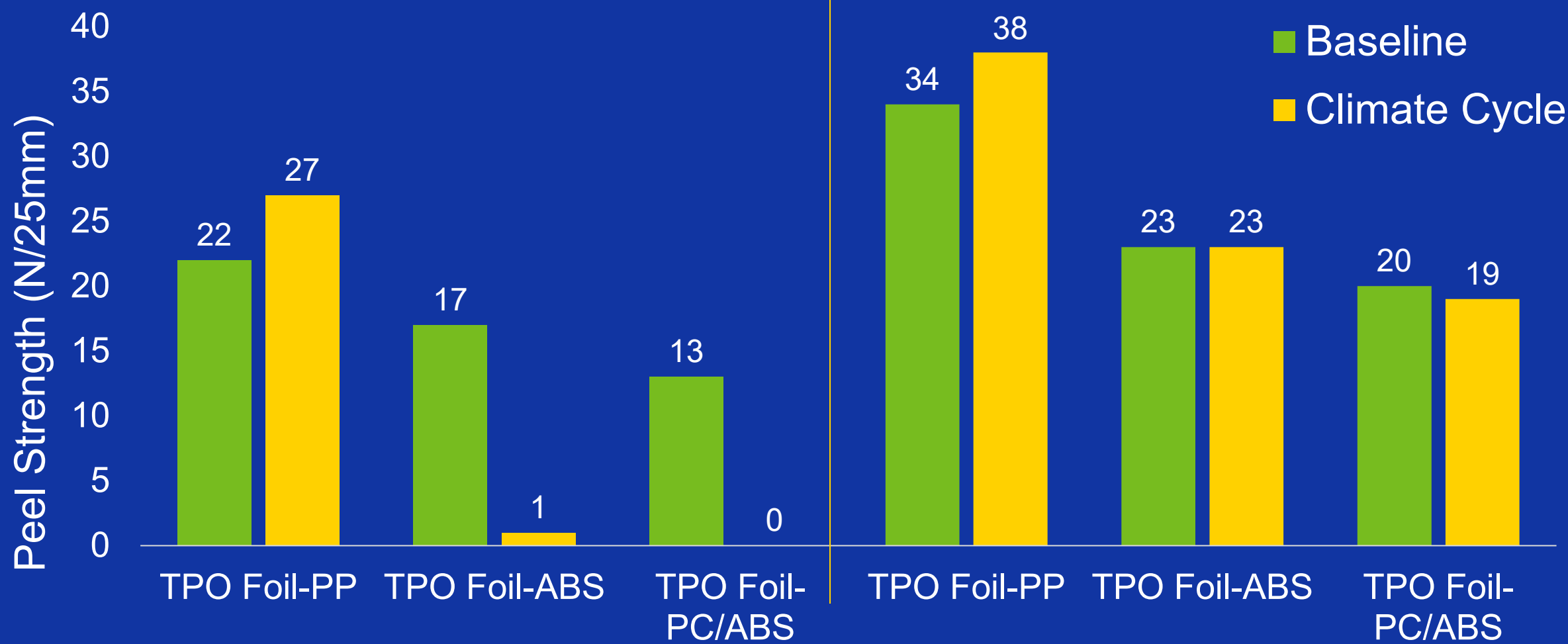
Performance Extends to 105°C



90°C Performance Outlasts Cycling

Benchmark

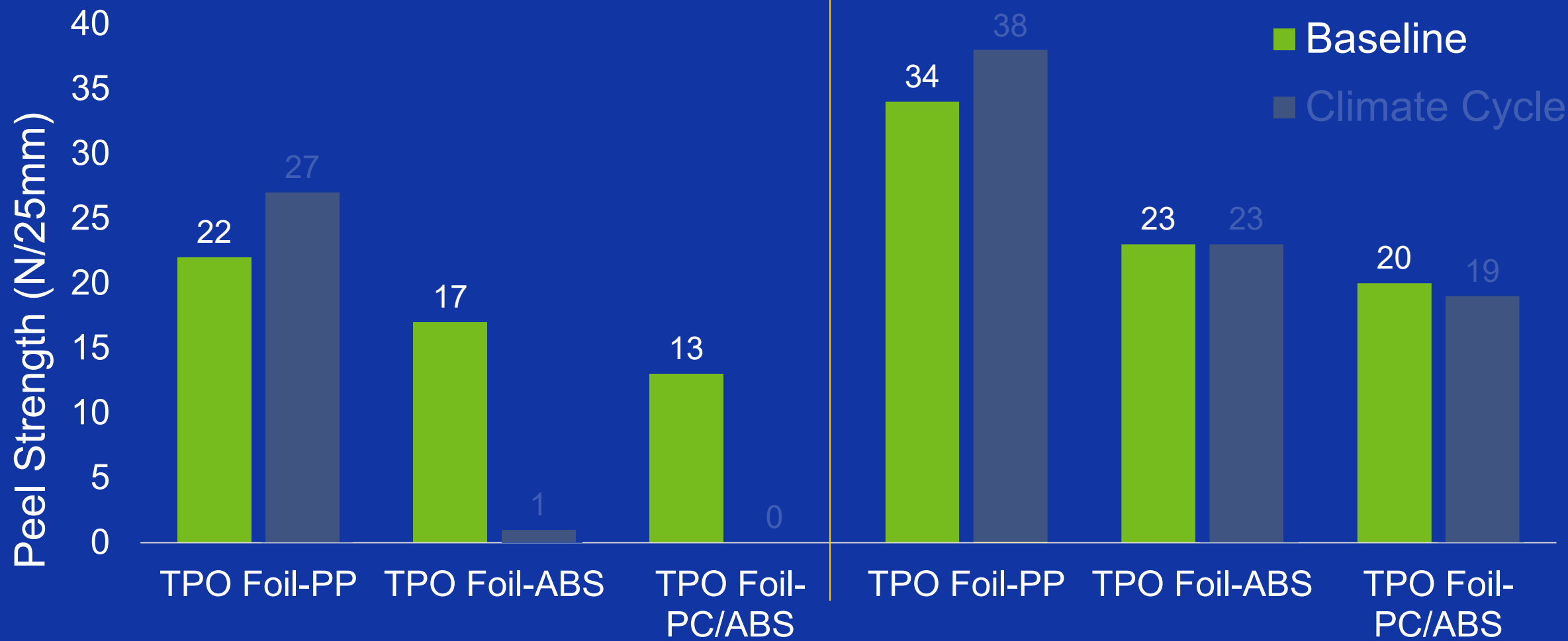
XP27910-1



90°C Baseline Performance

Benchmark

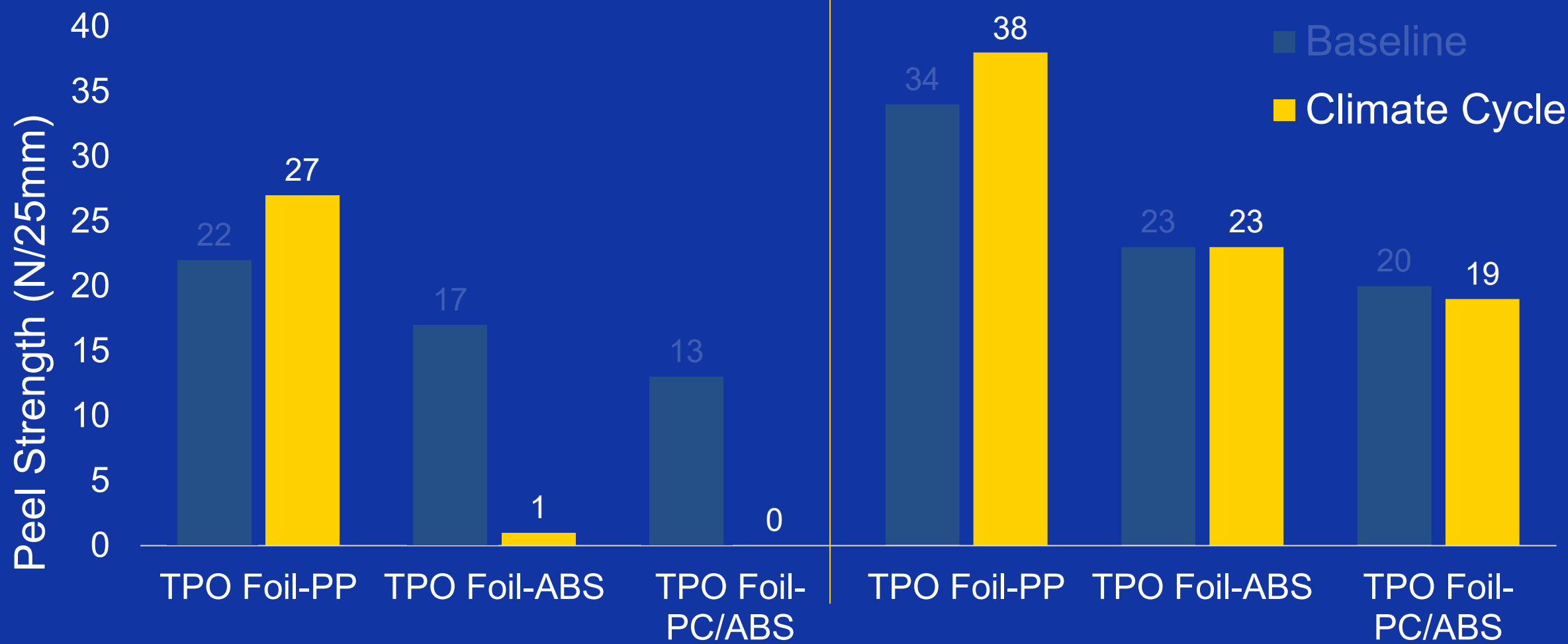
XP27910-1



90°C Cycled Performance

Benchmark

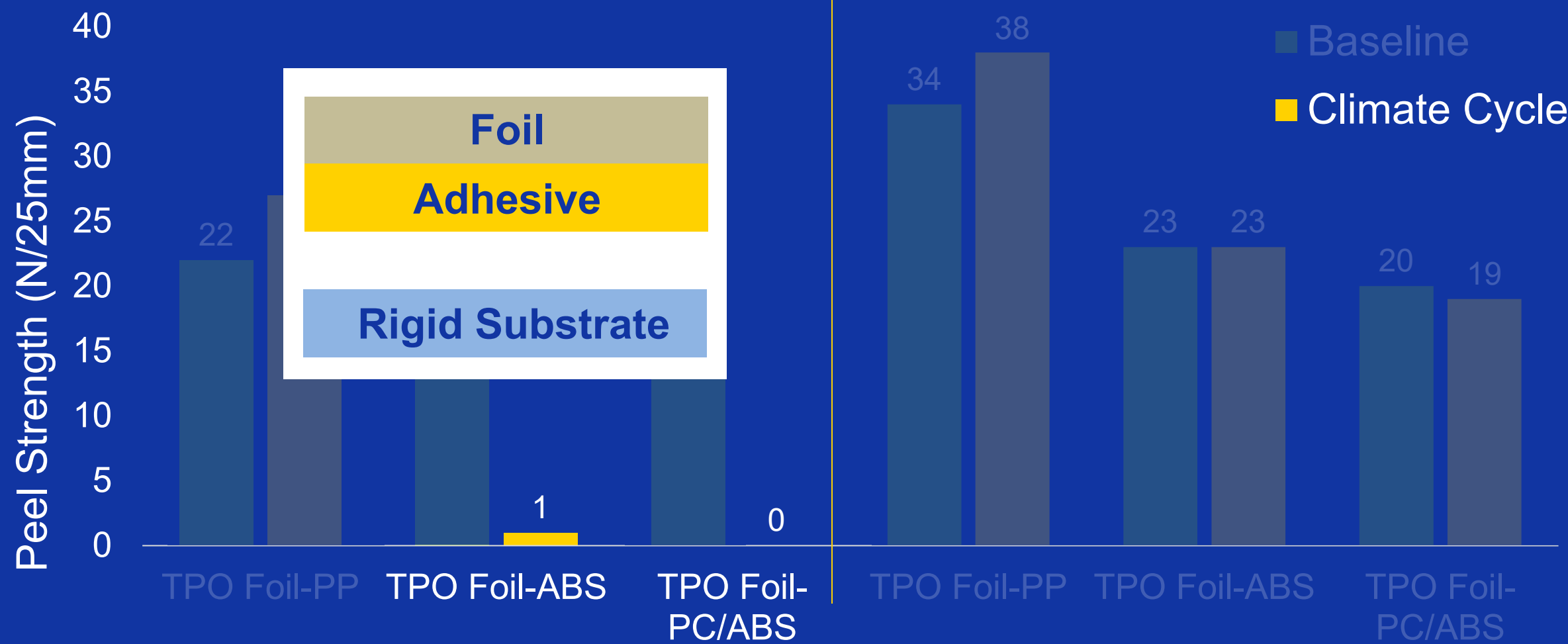
XP27910-1



Adhesive Failure After Cycling

Benchmark

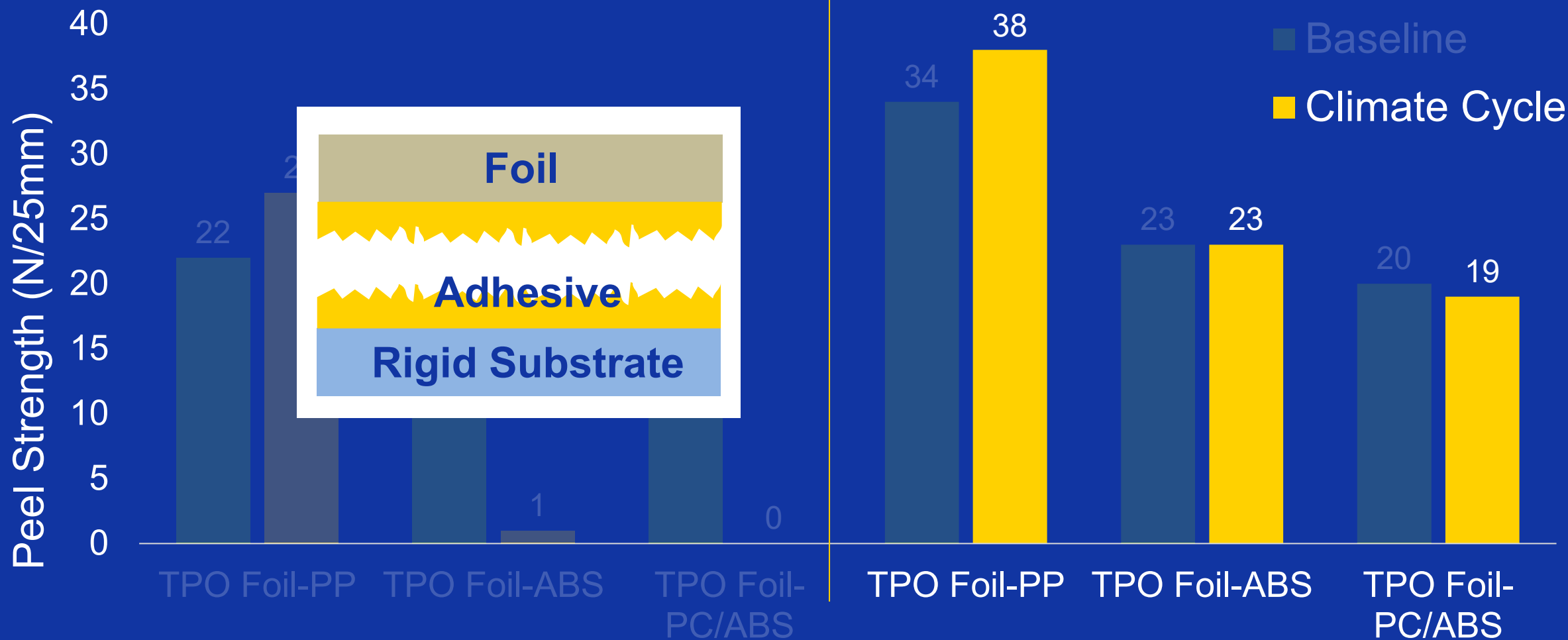
XP27910-1



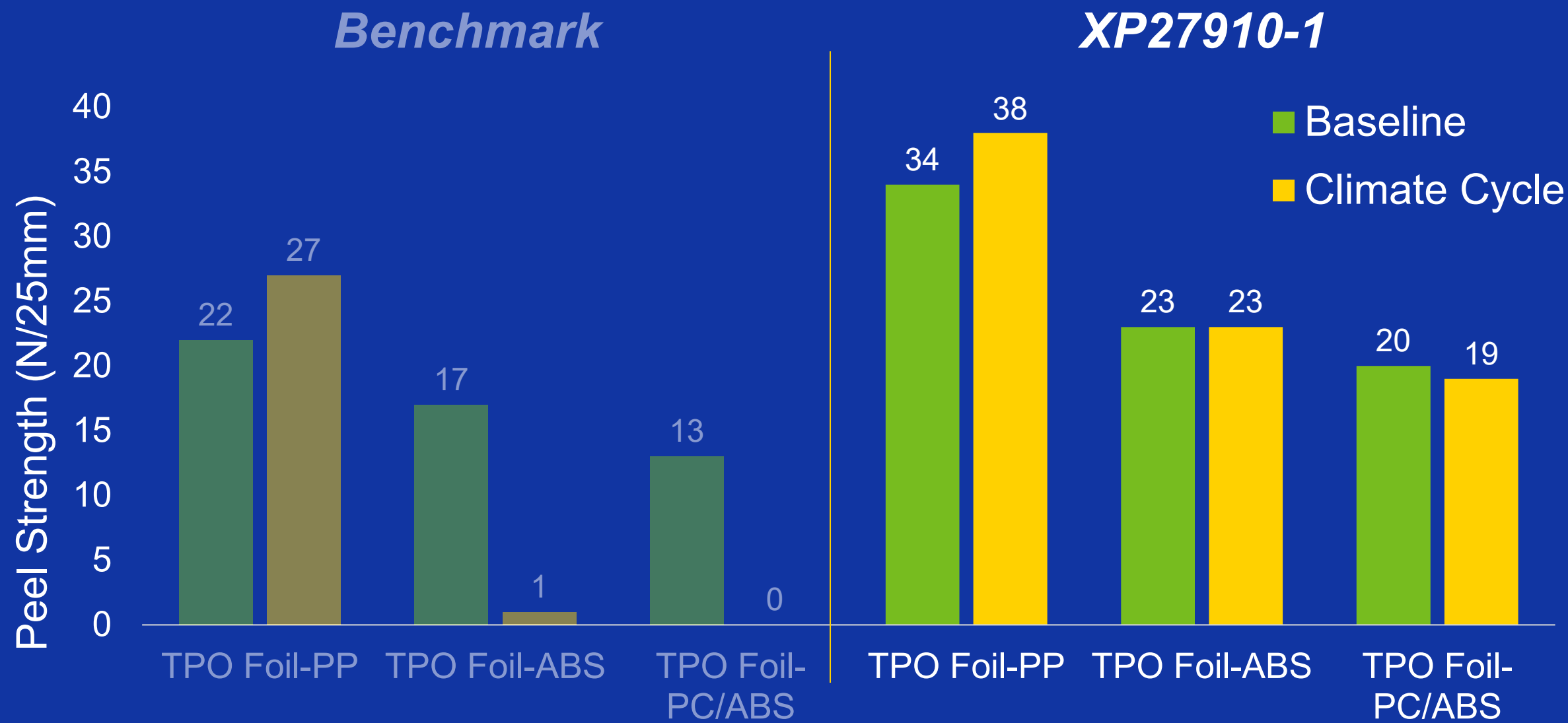
Cohesive Failure After Cycling

Benchmark

XP27910-1



XP27910-1 Outperforms Benchmark



XP27910-1 Resists Creep (24 hr, 80°C)

No Creep
at Bond
Line

1 N Static
Load



TPO Foil-PP



TPO Foil-ABS



TPO Foil-PC/ABS

XP27910-1 Resists Creep (24 hr, 80°C)



TPO Foil-PP



TPO Foil-ABS



TPO Foil-PC/ABS



High Performance Thermoplastic Hot Melt (TPHM)

XP27910-1

- ✓ Bonds non-polar and polar materials
- ✓ Optimizes bonding process
- ✓ Reduces capital investments
- ✓ Improves manufacturing efficiency



Let's Solve What's Next—Together.

Stop by our booth to learn more.



Thank You.

